4-CHANNEL POWER AMPLIFIER

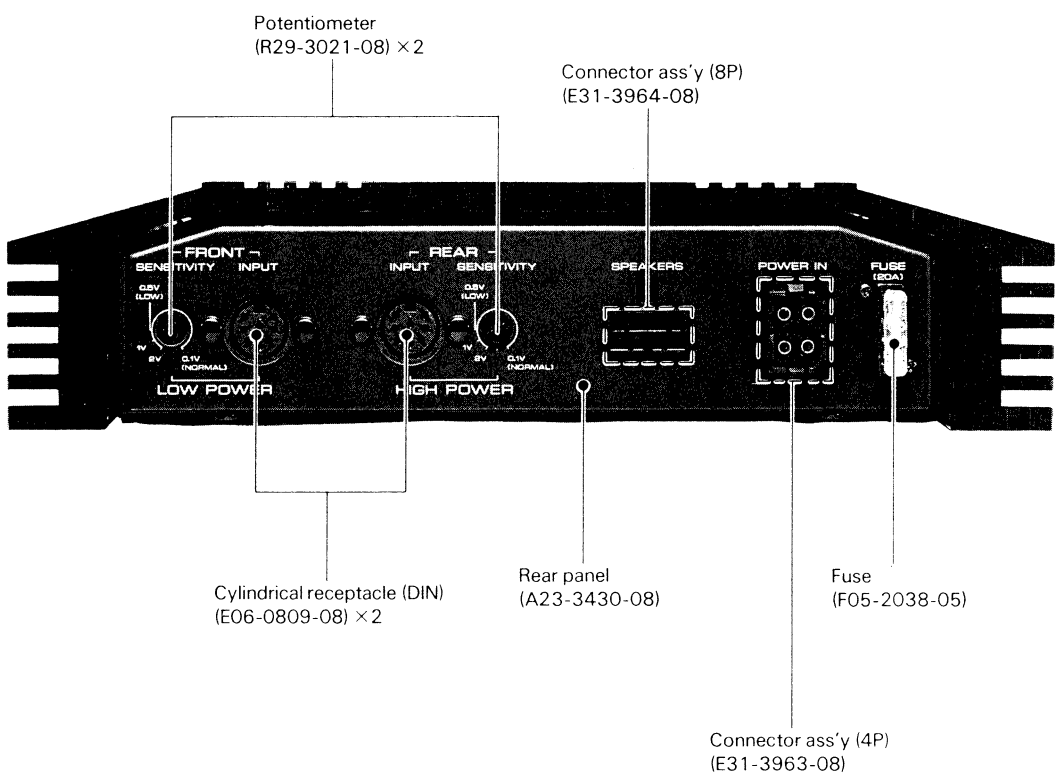
KAC-8070

SERVICE MANUAL

KENWOOD

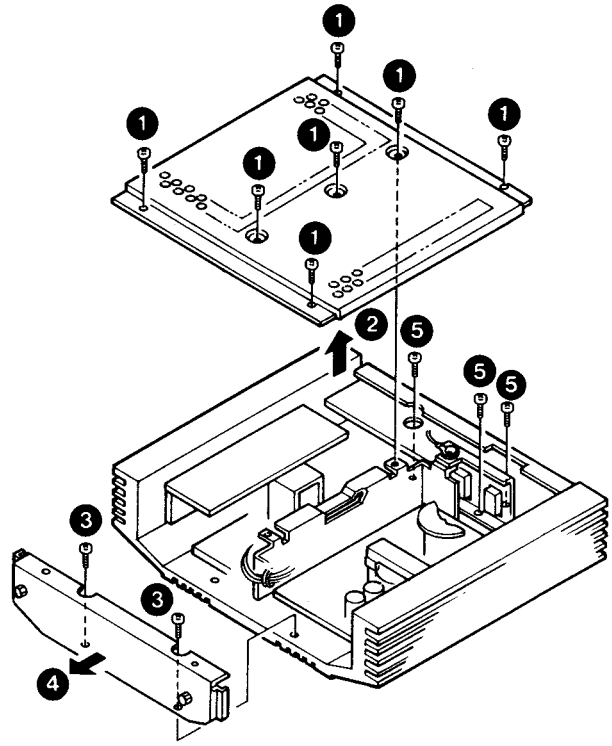
KENWOOD CORPORATION

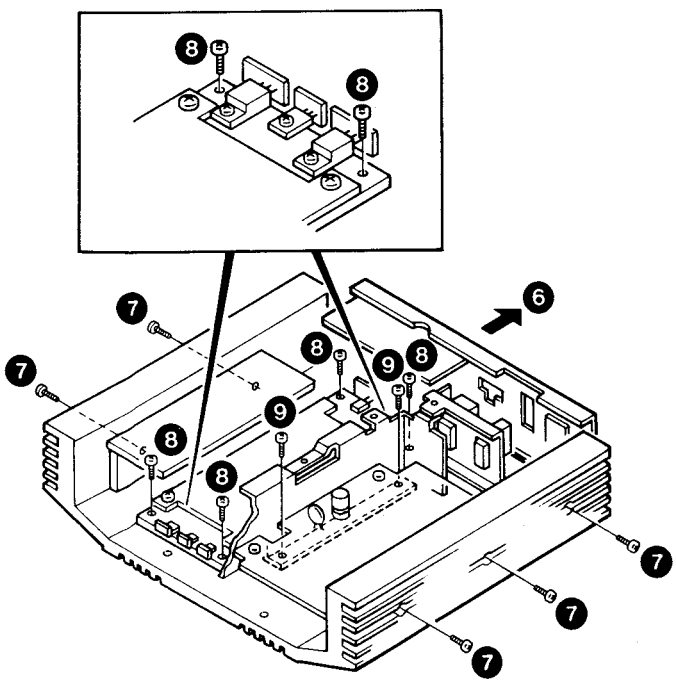
© 1986-10 PRINTED IN JAPAN
B51-3084-00(B) 3109

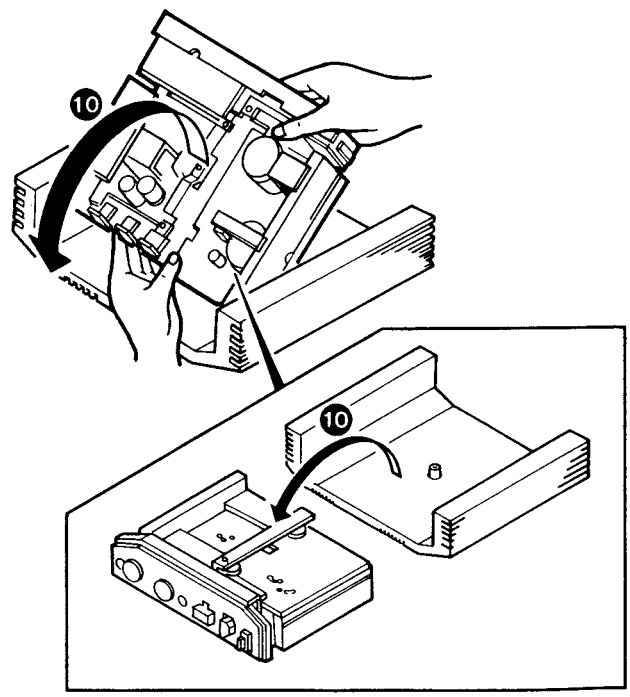


DISASSEMBLY FOR REPAIR

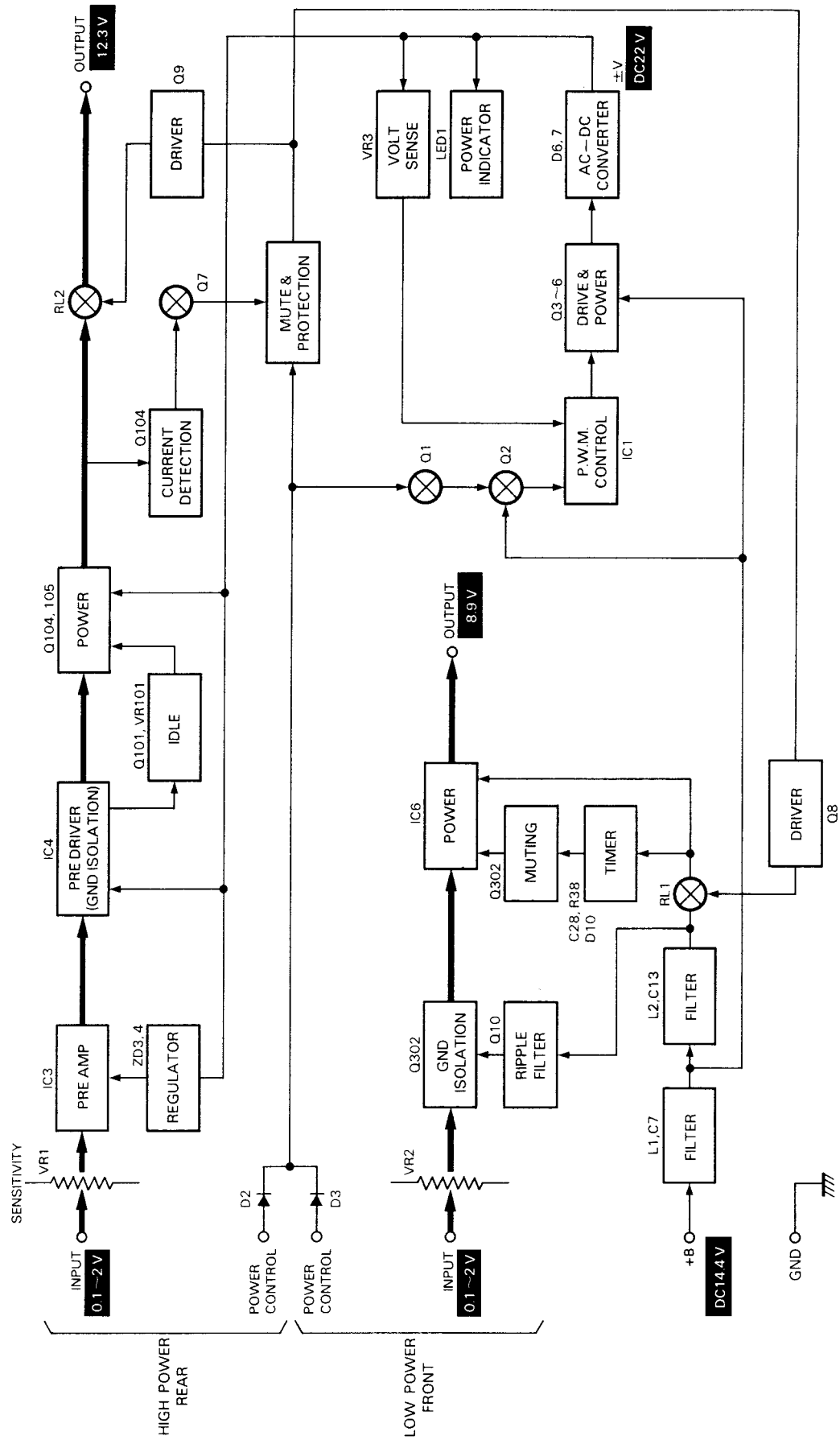
1. Remove the 7 screws on the bottom plate (❶).
2. Remove the bottom plate in the direction of the arrow (❷).
3. Remove the 2 screws on the front panel (❸).
4. Remove the front panel in the direction of the arrow (❹).
5. Remove the 3 screws on the rear panel and holder (❺).
6. Pull out the rear panel in the direction of the arrow (❻).
7. Remove the 5 screws on the heat sink (❼).
8. Remove the 4 screws on the transistor mounting hardware (❽).
9. Remove the 2 screws on the frame (❾).
10. Raise the PC board and rear panel and turn them in the direction of the arrow to remove from heat sink (❿). The pattern side of the PC board faces up.







BLOCK LEVEL DIAGRAM



CIRCUIT DESCRIPTION

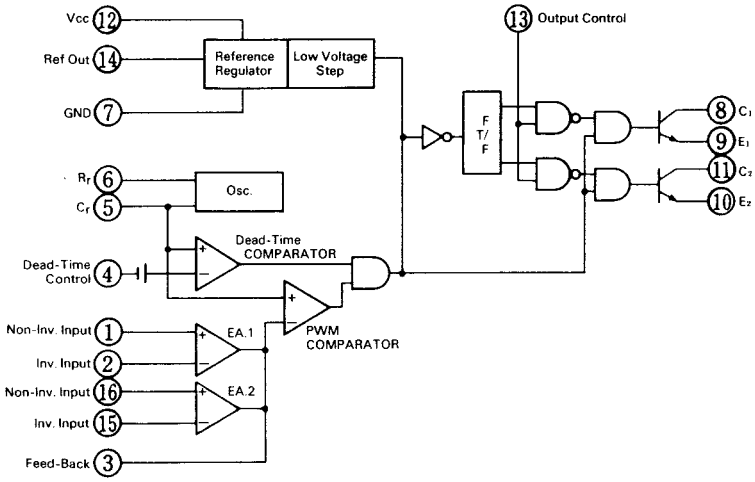
DC/DC power supply circuit

Features:

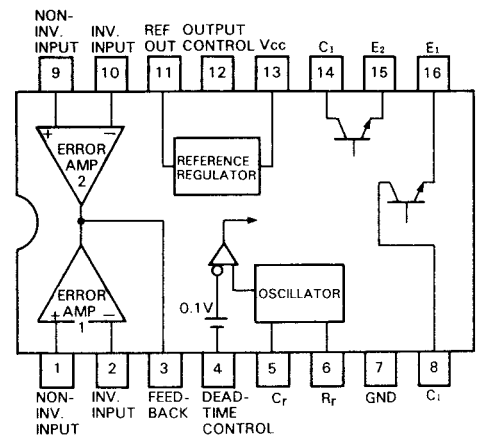
- Clock waveform is changed to pulse-width control system from pulse-width fixed system for greater AM/FM radiation when comparing with the conventional amplifier.
- The improved regulation of power supply to the amplifier effectively decreases the rise of heat at the normal listening volume level.
- Dead time can be set to the clock waveform for higher reliability.
- Regulation of the secondary side power supply is improved from the primary side of the DC power supply (battery)/AC (alternative).
- Switching regulator control IC is provided to simplify the circuit.

Switching regulator control IC: μPC494C

Block Diagram



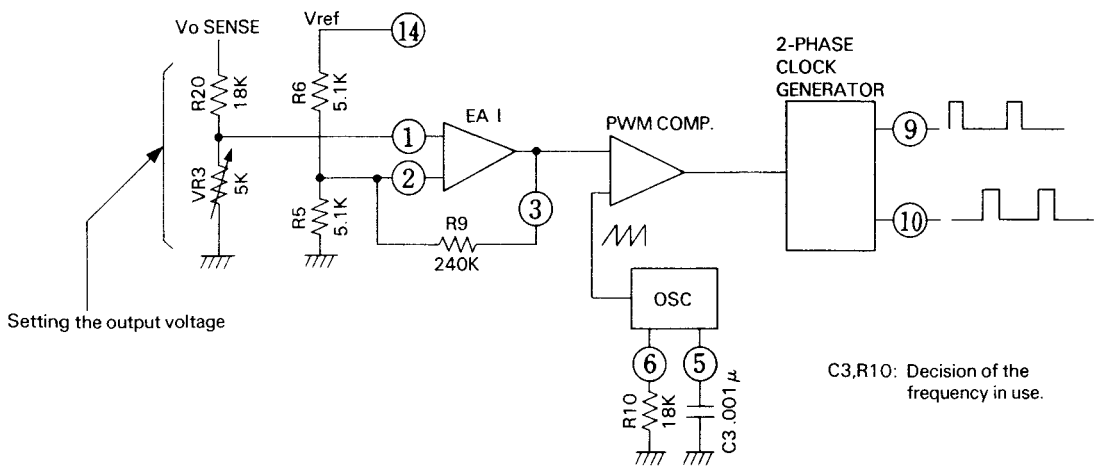
Connection Diagram (Top View)



In the above block diagram, EA2 at pin 15, 16 is not used.

Detailed description of the circuit (Reference numbers attached to the parts in the diagram are same as the actual circuit.)

- Voltage control amp (EA I) → 2-phase clock generator

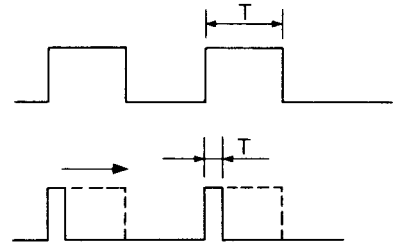


CIRCUIT DESCRIPTION

Clock waveform comparison

KAC-7020:
T is fixed regardless of the loaded condition of output voltage, etc.

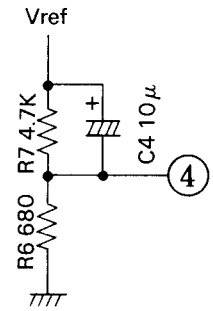
KAC-8070:
T (pulse width) is widened by 47% at maximum when the output voltage is increased or load is varied.



Dead time control circuit

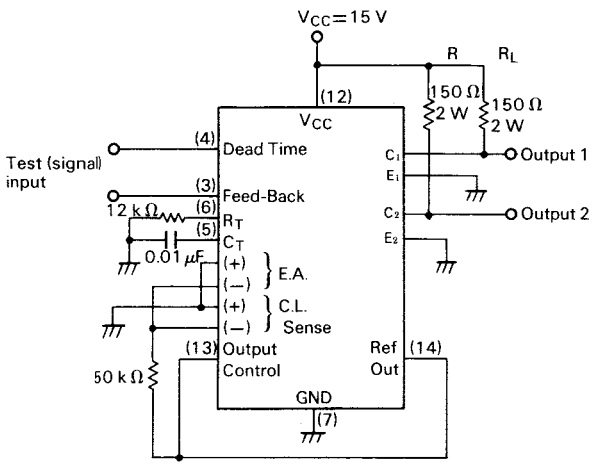
R6, 7:
Clock waveform is provided during the quiescent time to prevent cross current from occuring at Q5, 6 when overloaded.

C4:
For reducing the rush current when starting up.



Characteristic test circuit and operational waveforms

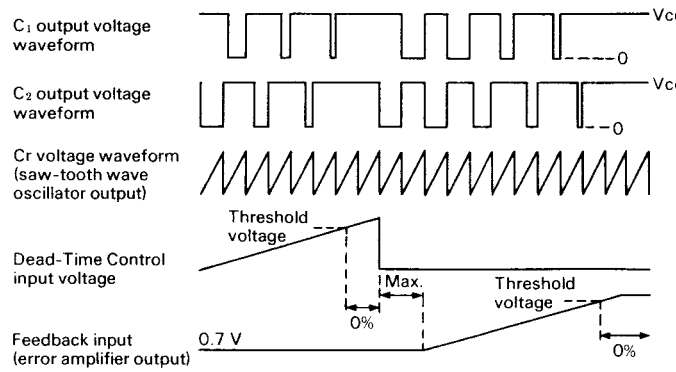
Test circuit



* Film capacitor is used

Note:
When emitter follower is output, the connecting method is changed. Connect C_1 and C_2 to Vcc and connect E_1 and E_2 to GND (ground) via RL respectively.

Operational waveforms



Output control pin connections (13-pin)

13-pin connection status	Operation mode
Ref Out	Push-pull
GND	Single (C_1, C_2 in-phase)

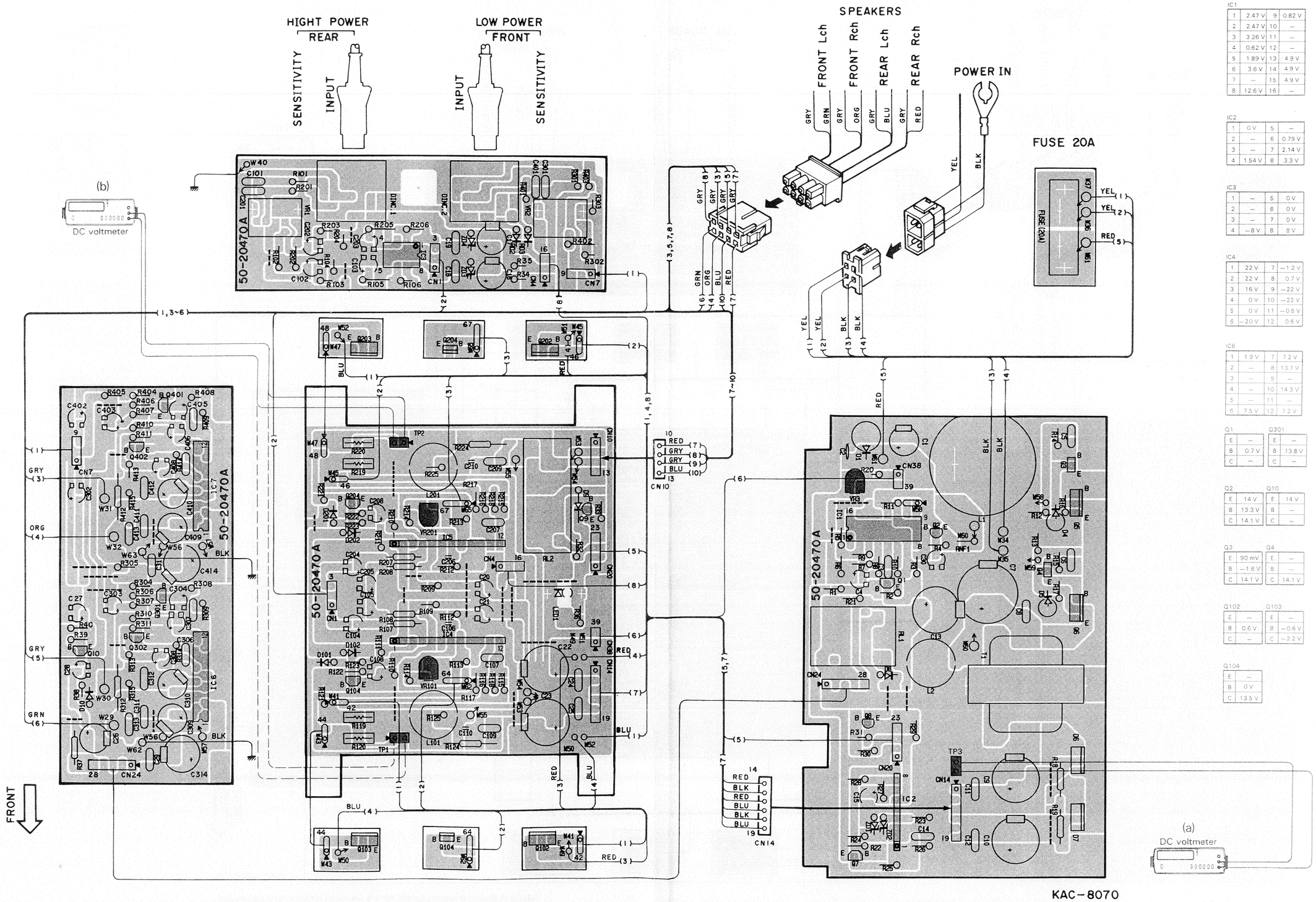
ADJUSTMENT/REGLAGE/ABGLEICH

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	DC/DC CONVERTER VOLTAGE	–	Connect a DC voltmeter to TP3.	VOLUME: 0	VR3	22V	(a)
2	IDLE CURRENT	–	Connect a DC voltmeter to TP1 and TP2.	VOLUME: 0	VR101 (L) VR201 (R)	6mV	(b)

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINS L'ALIGNEMENT	ALIGNER POUR	FIG.
1	TENTION DE CONVERTISSEUR CC/CC	–	Connecter un voltmètre de CC au TP3.	VOLUME: 0	VR3	22V	(a)
2	COURANT DE POLARISATION	–	Connecter un voltmètre de CC au TP1 et TP2.	VOLUME: 0	VR101 (G) VR201 (D)	6mV	(b)

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VERSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	DES GLEICHSTROM/ GLEICHSTROM-KONVERTERS SPANNUNG	–	Einen Gleichspannungs-messer zu TP3 anschließen.	VOLUME: 0	VR3	22V	(a)
2	LEERLAUF STROM	–	Einen Gleichspannungs-messer zu TP1 und TP2 anschließen.	VOLUME: 0	VR101 (L) VR102 (R)	6mV	(b)

PC BOARD (COMPONENT SIDE)



IC1

1	2.47 V	9	0.82 V
2	2.47 V	10	—
3	3.26 V	11	—
4	0.62 V	12	—
5	1.89 V	13	4.9 V
6	3.6 V	14	4.9 V
7	—	15	4.9 V
8	12.6 V	16	—

IC2

1	0 V	5	—
2	—	6	0.79 V
3	—	7	2.14 V
4	1.54 V	8	3.3 V

IC3

1	—	5	0 V
2	—	6	0 V
3	—	7	0 V
4	−8 V	8	8 V

IC4

1	22 V	7	−1.2 V
2	22 V	8	0.7 V
3	16 V	9	−22 V
4	0 V	10	−22 V
5	0 V	11	−0.6 V
6	−20 V	12	0.6 V

IC6

1	1.9 V	7	7.2 V
2	—	8	13.7 V
3	—	9	—
4	—	10	14.3 V
5	—	11	—
6	7.5 V	12	7.2 V

Q1

E	—
B	0.7 V
C	—

Q301

E	—
B	13.8 V
C	—

Q2

E	14 V
B	13.3 V
C	14.1 V

Q10

E	14 V
B	—
C	—

Q3

E	90 mV
B	−1.6 V
C	14.1 V

Q4

E	—
B	—
C	14.1 V

Q102

E	—
B	0.6 V
C	—

Q103

E	—
B	−0.6 V
C	−2.2 V

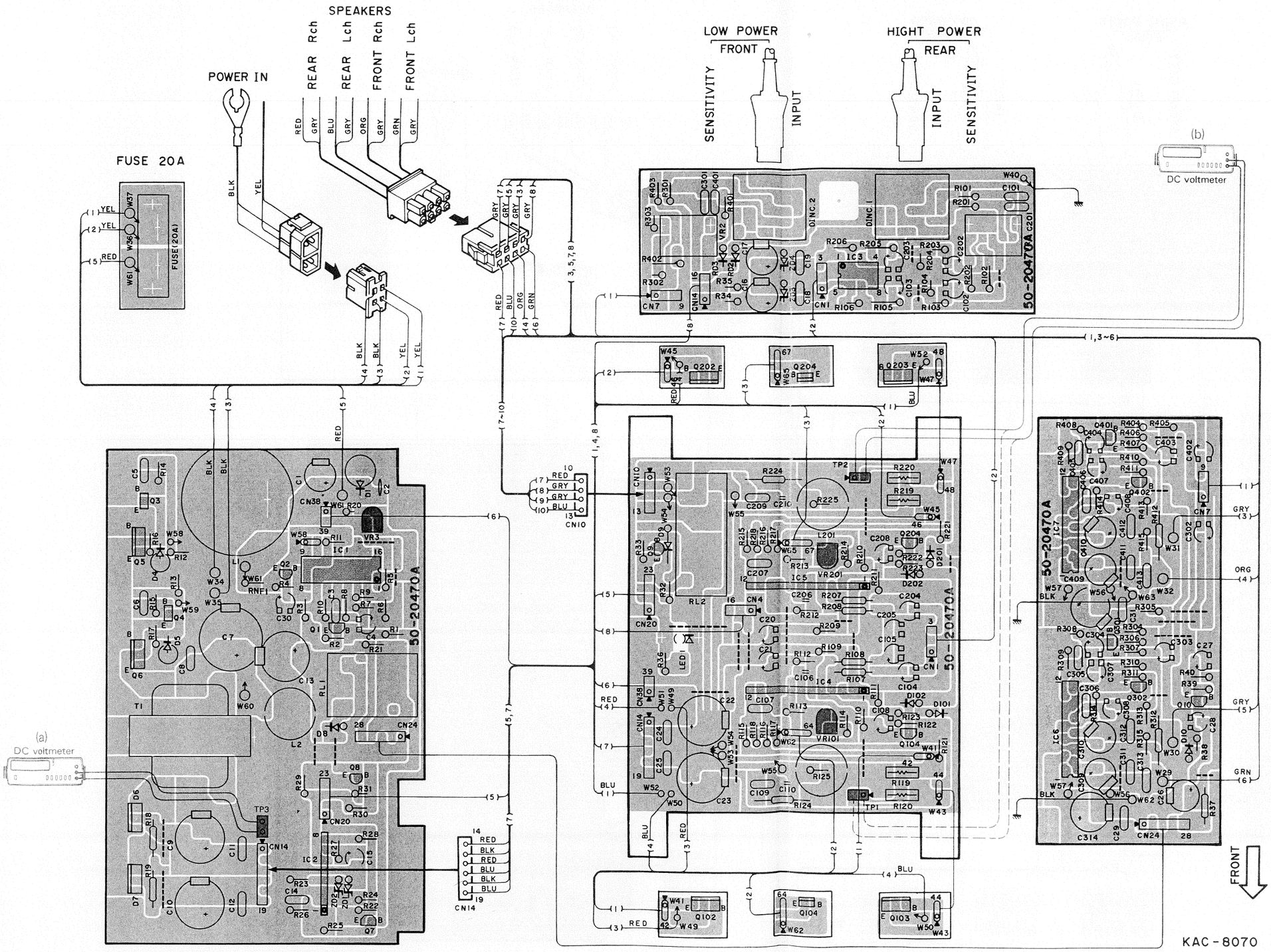
Q104

E	—
B	0 V
C	13.5 V

KAC−8070

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD (FOIL SIDE)



Refer to the schematic diagram for the values of resistors and capacitors.

IC1

1	2.47 V	9	0.82 V
2	2.47 V	10	—
3	3.26 V	11	—
4	0.62 V	12	—
5	1.89 V	13	4.9 V
6	3.6 V	14	4.9 V
7	—	15	4.9 V
8	12.6 V	16	—

IC2

1	0 V	5	—
2	—	6	0.79 V
3	—	7	2.14 V
4	1.54 V	8	3.3 V

IC3

1	—	5	0 V
2	—	6	0 V
3	—	7	0 V
4	−8 V	8	8 V

IC4

1	22 V	7	−1.2 V
2	22 V	8	0.7 V
3	16 V	9	−22 V
4	0 V	10	−22 V
5	0 V	11	−0.6 V
6	−20 V	12	0.6 V

IC6

1	1.9 V	7	7.2 V
2	—	8	13.7 V
3	—	9	—
4	—	10	14.3 V
5	—	11	—
6	7.5 V	12	7.2 V

Q1

E	—
B	0.7 V
C	—

Q301

E	—
B	13.8 V
C	—

Q2

E	14 V
B	13.3 V
C	14.1 V

Q10

E	14 V
B	—
C	—

Q3

E	90 mV
B	−1.6 V
C	14.1 V

Q4

E	—
B	—
C	14.1 V

Q102

E	—
B	0.6 V
C	—

Q103

E	—
B	−0.6 V
C	−2.2 V

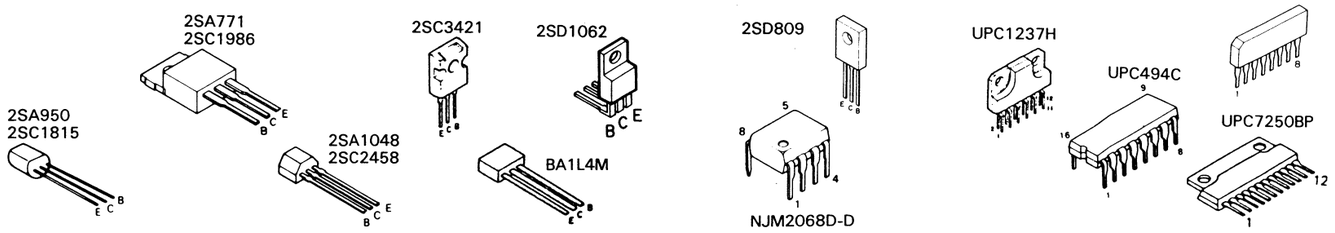
Q104

E	—
B	0 V
C	13.5 V

IC1	: μPC494C	Q1,104,204	: 2SC2458(GR)	Q10	: 2SC1815(BL)	D1	: RM4Z	D7	: FMU12R
IC2	: μPC1237H	Q2,8,9	: 2SA950(Y)	Q101,201	: 2SC3421(Y)	D2,3,10,101	: IS2076A	D8,9	: 1N4002
IC3	: NJM2068D-D	Q3,4	: 2SD809(F,E)	Q102,202	: 2SC1986(O,Y)	102,201,202		ZD1	: HZ7C1L
IC4,5	: μPC1270H	Q5,6	: 2SD1062(S)	Q103,203	: 2SA771(O,Y)	D4,5	: RH1Z	ZD2	: HZ6C2L
IC6,7	: TA7250BP	Q7,301,401	: 2SA1048(GR)	Q302,402	: BA1L4M	D6	: FMU12S	ZD3,4	: HZ9A-2

LED1 : B30-1120-08

GND LINE
+B LINE
−B LINE



DC voltages are as measured with a high impedance voltmeter with no signal input. Values may vary slightly due to variations between individual instruments or/and units.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance sans signal d'entrée. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

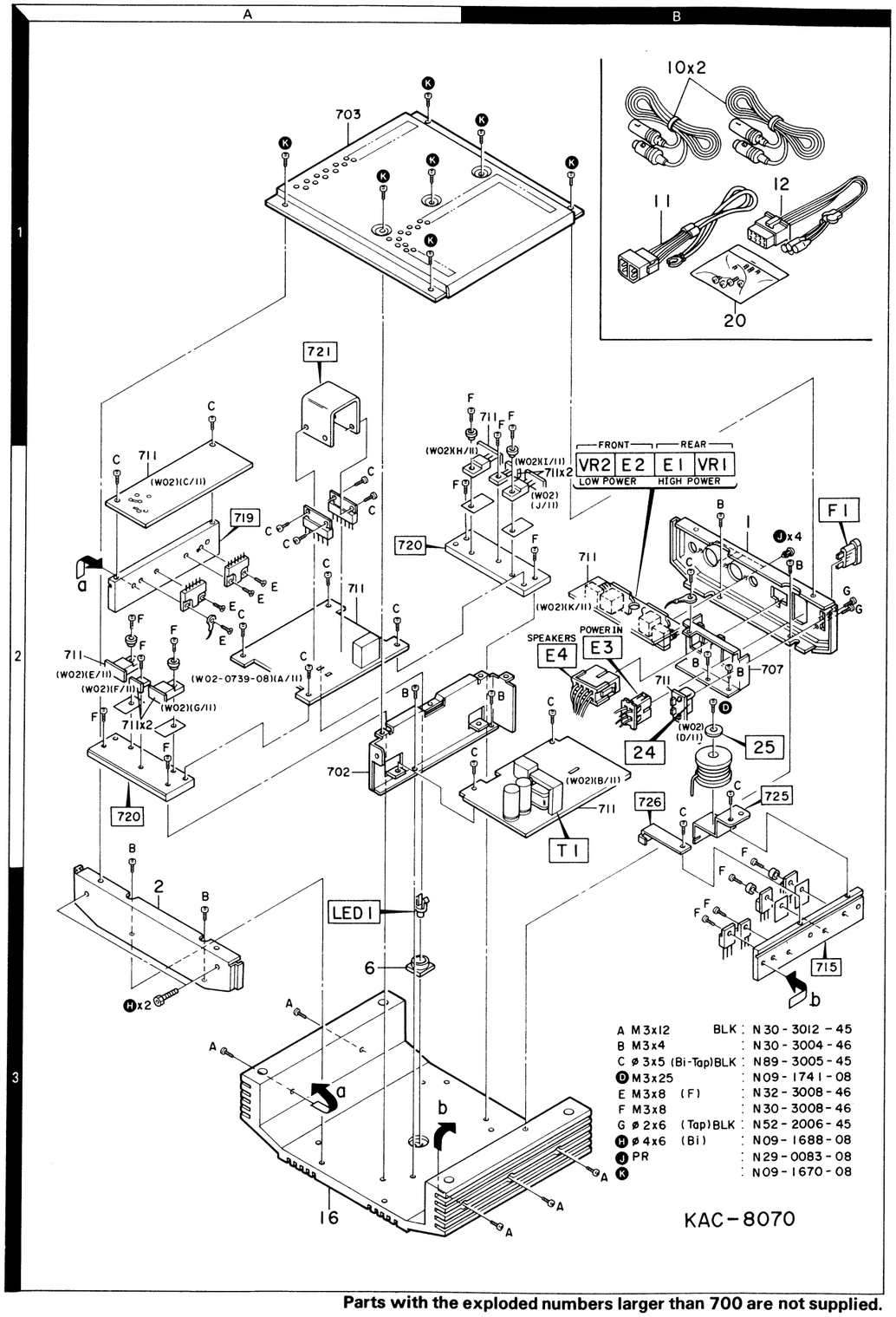
Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser ohne Eingangssignal gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u. U. geringfügig.

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

KAC-8070

KENWOOD

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Telle ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
KAC-8070						
1	2B	*	A23-3430-08	REAR PANEL		
2	3A	*	A29-0098-08	PANEL	E	
2	3A	*	A29-0099-08	PANEL	T	
6	3A		B19-0395-08	LIGHTING BOARD	T	
-			B46-0100-00	WARRANTY CARD	E	
-			B46-0123-03	WARRANTY CARD	T	
-		*	B50-6559-00	INSTRUCTION MANUAL(ENG,FRE)	E	
-		*	B50-6560-00	INSTRUCTION MANUAL(GER,ITA)	E	
-		*	B50-6561-00	INSTRUCTION MANUAL(ENGLISH)	T	
-			B58-0803-03	CAUTION CARD		
-		*	B58-0831-00	CAUTION CARD		
10	1B		E30-1477-08	DIN CORD (2M)		
11	1B	*	E30-1551-08	DC POWER CORD		
12	1B	*	E30-1552-08	SPEAKER CORD		
16	3A	*	F01-1144-08	HEAT SINK	E	
16	3A	*	F01-1145-08	HEAT SINK	T	
-		*	H01-7404-08	ITEM CARTON BOX	E	
-		*	H01-7405-08	ITEM CARTON BOX	T	
-		*	H03-0881-08	OUTER PACKING CASE	E	
-		*	H03-0882-08	OUTER PACKING CASE	T	
-			H10-3373-08	POLYSTYRENE FOAMED FIXTURE(L)		
-		*	H10-3374-08	POLYSTYRENE FOAMED FIXTURE(R)		
-		*	H13-0006-08	PAPER BOARD		
-			H25-0096-04	PROTECTION BAG		
-			H25-0112-04	PROTECTION BAG		
-			H25-0173-04	PROTECTION BAG		
20	1B	*	N99-0244-08	SCREW SET (Ø4X45)		
H	3A	*	N09-1688-08	SCREW (Ø4X6)		
J	2B		N29-0083-08	PUSH RIVET		
K	1A,1B		N09-1670-08	SCREW		
ELECTRIC UNIT (W02-0739-08)						
LED1	3A	*	B30-1120-08	LED (SEL2213C) POWER		
C1			CE04DW1C221M	ELECTRO 220UF 16WV		
C2			CK45F1H473K	CERAMIC 0.047UF K		
C3			CQ92M1H102K	MYLAR 1000PF K		
C4			CE04DW1C100M	ELECTRO 10UF 16WV		
C5 ,6			CF92FV1H473J	MF 0.047UF J		
C7		*	C90-1356-08	ELECTRO 3900UF 16WV		
C8		*	C91-0843-08	CERAMIC 1UF 50WV		
C9 ,10		*	C90-1472-08	CERAMIC 2200UF 25WV		
C11 ,12			CF92FV1H104J	MF 0.10UF J		
C13			CE04DW1C222M	ELECTRO 2200UF 16WV		
C14			CQ92M1H103K	MYLAR 0.010UF K		
C15			CE04DW1H4R7M	ELECTRO 4.7UF 50WV		
C16 ,17			CE04DW1A221M	ELECTRO 220UF 10WV		
C18 ,19			CF92FV1H104J	MF 0.10UF J		
C20 ,21			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C22 ,23			CE04DW1E102M	ELECTRO 1000UF 25WV		
C24 ,25			CF92FV1H104J	MF 0.10UF J		
C26			CE04DW1C221M	ELECTRO 220UF 16WV		
C27			CE04DW1C470M	ELECTRO 47UF 16WV		

E: Scandinavia & Europe H:Audio Club K: USA P: Canada W:Europe
T: England U: PX(Far East, Hawaii)
UE : AAFES(Europe) X: Australia M: Other Areas

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Telle ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
C28			CE04DW1HR33M	ELECTRO 0.33UF 50WV		
C29			CF92FV1H473J	MF 0.047UF J		
C30			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C31			CF92FV1H473J	MF 0.047UF J		
C101			CQ92M1H102K	MYLAR 1000PF K		
C102			CE04DW1C100M	ELECTRO 10UF 16WV		
C103-105			CE04DW1A101M	ELECTRO 100UF 10WV		
C106			CC45CH1H330J	CERAMIC 33PF J		
C107			CQ92M1H333K	MYLAR 0.033UF K		
C108			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C109			CF92FV1H473J	MF 0.047UF J		
C110			CK45B1H102K	CERAMIC 1000PF K		
C201			CQ92M1H102K	MYLAR 1000PF K		
C202			CE04DW1C100M	ELECTRO 10UF 16WV		
C203-205			CE04DW1A101M	ELECTRO 100UF 10WV		
C206			CC45CH1H330J	CERAMIC 33PF J		
C207			CQ92M1H333K	MYLAR 0.033UF K		
C208			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C209			CF92FV1H473J	MF 0.047UF J		
C210			CK45B1H102K	CERAMIC 1000PF K		
C301			CQ92M1H102K	MYLAR 1000PF K		
C302			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C303			CE04DW1C100M	ELECTRO 10UF 16WV		
C304			CE04DW1H4R7M	ELECTRO 4.7UF 50WV		
C305			CQ92M1H102K	MYLAR 1000PF K		
C306			CQ92M1H333K	MYLAR 0.033UF K		
C307,308			CE04DW1A101M	ELECTRO 100UF 10WV		
C309,310			CE04DW1C221M	ELECTRO 220UF 16WV		
C311-313			CF92FV1H154J	MF 0.15UF J		
C314			CE04DW1C102M	ELECTRO 1000UF 16WV		
C401			CQ92M1H102K	MYLAR 1000PF K		
C402			CE04DW1H2R2M	ELECTRO 2.2UF 50WV		
C403			CE04DW1C100M	ELECTRO 10UF 16WV		
C404			CE04DW1H4R7M	ELECTRO 4.7UF 50WV		
C405			CQ92M1H102K	MYLAR 1000PF K		
C406			CQ92M1H333K	MYLAR 0.033UF K		
C407,408			CE04DW1A101M	ELECTRO 100UF 10WV		
C409,410			CE04DW1C221M	ELECTRO 220UF 16WV		
C411-413			CF92FV1H154J	MF 0.15UF J		
C414			CE04DW1C102M	ELECTRO 1000UF 16WV		
E1 ,2	2B		E06-0809-08	CYLINDRICAL RECEPTACLE		
E3	2B	*	E31-3963-08	CONNECTING WIRE		
E4	2B	*	E31-3964-08	CONNECTING WIRE		
F1	2B	*	F05-2038-05	FUSE (20A)		
24	2B	*	J13-0063-08	FUSE HOLDER		
L1		*	L33-0321-08	CHOKE COIL		
L2		*	L33-0317-08	CHOKE COIL		
L101		*	L39-0113-08	COIL		
L201		*	L39-0113-08	COIL		
T1	2B	*	L19-0049-08	BALUN TRANSFORMER		
25	2B	*	N19-1059-08	FLAT WASHER (5X3X10)		
D	2B	*	N09-1741-08	SCREW (Ø3X25)		

E: Scandinavia & Europe H:Audio Club K: USA P: Canada W:Europe
T: England U: PX(Far East, Hawaii)
UE : AAFES(Europe) X: Australia M: Other Areas

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Telle ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
R34 ,35		*	RD14CB2H821J	RD 820 J 1/2W		
R36		*	RD14CB2H202J	RD 2.0K J 1/2W		
R107,108		*	RN14BK2E202G	RN 2.0K G 1/4W		
R109,110		*	RN14CK2E563G	RN 56K G 1/4W		
R119,120		*	R92-0266-08	METAL PLATE 0.1 J 2W		
R124			RS14AB3A100J	FL-PROOF RS 10 J 1W		
R125		*	RD14CB2H100J	RD 10 J 1/2W		
R207,208		*	RN14BK2E202G	RN 2.0K G 1/4W		
R209,210		*	RN14CK2E563G	RN 56K G 1/4W		
R219,220		*	R92-0266-08	METAL PLATE 0.1 J 2W		
R224			RS14AB3A100J	FL-PROOF RS 10 J 1W		
R225		*	RD14CB2H100J	RD 10 J 1/2W		
R310,311		*	RN14CK2E200G	RN 20 G 1/4W		
R312		*	RN14BK2E821G	RN 820 G 1/4W		
R313		*	RN14CK2E821G	RN 820 G 1/4W		
R410,411		*	RN14CK2E200G	RN 20 G 1/4W		
R412		*	RN14BK2E821G	RN 820 G 1/4W		
R413		*	RN14CK2E821G	RN 820 G 1/4W		
RNF1			R92-0351-08	RN 1 K 1/4W		
VR1 ,2	2B	*	R29-3021-08	POTENTIOMETER(20KBX2)SENS		
VR3		*	R12-2038-08	TRIMMING POT.(5KB)VOLT SENSE		
VR101		*	R12-1081-08	TRIMMING POT.(1KB)IDLE		
VR201		*	R12-1081-08	TRIMMING POT.(1KB)IDLE		
RL1		*	S51-1047-08	RELAY (MUTING)		
RL2		*	S51-2083-08	RELAY (MUTING)		
D1			RM4Z	DIODE		
D2 ,3			1S2076A	DIODE		
D4 ,5			RH1Z	DIODE		
D6		*	FMU12S	DIODE		
D7		*	FMU12R	DIODE		
D8 ,9			1N4002	DIODE		
D10			1S2076A	DIODE		
D101,102			1S2076A	DIODE		
D201,202			1S2076A	DIODE		
IC1		*	UPC494C	IC(SWITCHING REGULATOR)		
IC2			UPC1237H	IC(PROTECTION)		
IC3			NJM2068D-D	IC(OP AMP X2)		
IC4 ,5			UPC1270H	IC(POWER AMP)		
IC6 ,7		*	UPC7250BP	IC(POWER AMP)		
Q1			2SC2458(GR)	TRANSISTOR		
Q2			2SA950(Y)	TRANSISTOR		
Q3 ,4		*	2SD809(F,E)	TRANSISTOR		
Q5 ,6			2SD1062(S)	TRANSISTOR		
Q7			2SA1048(GR)	TRANSISTOR		
Q8 ,9			2SA950(Y)	TRANSISTOR		
Q10			2SC1815(BL)	TRANSISTOR		
Q101			2SC3421(Y)	TRANSISTOR		
Q102			2SC1986(O,Y)	TRANSISTOR		
Q103			2SA771(O,Y)	TRANSISTOR		
Q104			2SC2458(GR)	TRANSISTOR		
Q201			2SC3421(Y)	TRANSISTOR		
Q202			2SC1986(O,Y)	TRANSISTOR		
Q203			2SA771(O,Y)	TRANSISTOR		
Q204			2SC2458(GR)	TRANSISTOR		

E: Scandinavia & Europe H:Audio Club K: USA P: Canada W:Europe
T: England U: PX(Far East, Hawaii)
UE : AAFES(Europe) X: Australia M: Other Areas

⚠ indicates safety critical components.

PARTS LIST

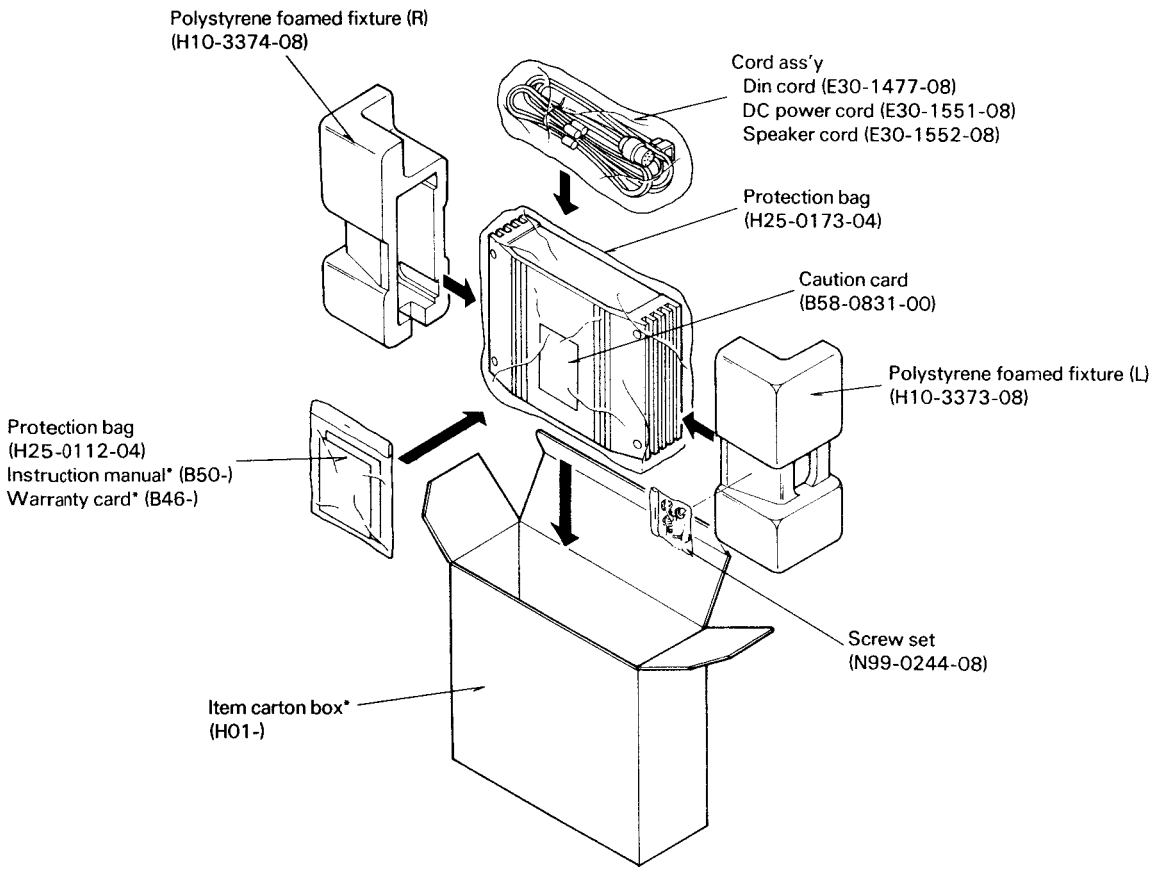
* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Telle ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
Q301			2SA1048(GR)	TRANSISTOR		
Q302		*	BA1L4M	TRANSISTOR		
Q401			2SA1048(GR)	TRANSISTOR		
Q402		*	BA1L4M	TRANSISTOR		
ZD1		*	HZ7C1L	ZENER DIODE		
ZD2		*	HZ6C2L	ZENER DIODE		
ZD3 ,4			HZ9A-2	ZENER DIODE		

E: Scandinavia & Europe H:Audio Club K: USA P: Canada W:Europe
T: England U: PX(Far East, Hawaii)
UE : AAFES(Europe) X: Australia M: Other Areas

⚠ indicates safety critical components.

PACKING



KAC-8070

SPECIFICATIONS

Specifications subject to change without notice

Audio Section

Maximum Power Output (4 ohms, 1 kHz)
- Rear ..... 70 W + 70 W
- Front ..... 35 W + 35 W

Power Output (4 ohms, 1 kHz 10% THD)
- Rear ..... 45 W + 45 W
- Front ..... 25 W + 25 W

(4 ohms, 20 Hz ~ 30 kHz, 1% THD)
- Rear ..... 37 W + 37 W
- Front ..... 20 W + 20 W

Frequency Response (−3 dB)
- Rear ..... 2 Hz ~ 100 kHz
- Front ..... 5 Hz ~ 50 kHz

Total Harmonic Distortion (10 W, 1 kHz, 4 ohms) 0.007%
Signal to Noise Ratio (IEC-A) ..... 100 dB
Sensitivity (rated output)
- Max. ..... 0.1 V
- Min. ..... 2.0 V

Input Impedance ..... 10 kΩ
Damping Factor (1 kHz) ..... more than 100

General

Operating voltage ..... 14.4 V (11 ~ 16 V)
Current Consumption (Max.) ..... 16 A
Dimensions (W × H × D) ..... 240 × 57 × 170 mm
(9-7/16") × (2-1/4") × (6-3/4")
Weight ..... 2.5 kg
5.5 lb

Note:
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

KENWOOD ELECTRONICS
1315 E. Watsoncenter Rd, Carson, California 90745;
75 Seaview Drive, Secaucus, New Jersey 07094, U.S.A.

KENWOOD ELECTRONICS CANADA INC.
1070 Jayson Court, Mississauga, Ontario, Canada L4W 2V5

KENWOOD ELECTRONICS BENELUX N.V.
Leuvensesteenweg 504 B-1930 Zaventem, Belgium

KENWOOD ELECTRONICS DEUTSCHLAND GMBH
Rembrücker-Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD FRANCE S.A.
5, Boulevard Ney, 75018 Paris, France

TRIO ELECTRONICS (U.K.) LIMITED
17 Bristol Road, The Metropolitan Centre, Greenford, Middx. UB6 8UP England

KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
4E Woodcock Place, Lane Cove, N.S.W. 2066, Australia

KENWOOD & LEE ELECTRONICS, LTD.
Wang Kee Building, 5th Floor, 34-37, Connaught Road, Central, Hong Kong